AN

ESSAY

ON

THE SHOULDER-JOINT

Operation;

PRINCIPALLY DEDUCED FROM

ANATOMICAL OBSERVATION

BY

W. W. FRASER,

SURGEON MAJOR TO THE GARRISON OF GIBRALTAR.

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TO

JAMES M'GRIGOR, Esq. M.D. F.R.S.ED

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
EDINBURGH;
INSPECTOR OF ARMY HOSPITALS;
AND
PRINCIPAL MEDICAL OFFICER WITH LORD WELLINGTON'S
ARMY.

MY DEAR SIR,

The highly distinguished situation you now hold, enables you more fully than any other to appreciate the following Remarks.

I submit them with pleasure to your consideration, as I am satisfied they will receive a candid investigation; and as it affords me an opportunity of expressing my esteem. Believe me,

MY DEAR SIR,

Sincerely and respectfully your's,

Gibraltar,
1st January, 1813.

W. W. FRASER.

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OPERATION.

I SEIZE the hasty intervals afforded by a very active situation, to connect such sentiments on a serious professional point, as presented themselves to my mind, at the hour of operation, and of the correctness of which, I am more impressed by farther consideration.

The duties which the Army Surgeon is called upon to perform are very numerous, often extra-professional; their interruptions, the instability of situation, and want of books of reference, present, innumerable obstacles to research. These may in some degree palliate, if the observations I am about to offer on a subject, in itself somewhat rare, appear crude or trite, or if the opinions I venture seem more the untenable speculations of a theorist, than the result of deliberation, and careful anatomical investigation; but even these imputations I will hazard, as the question is simple; and as it is purely practical, if it adds an iota to use, I shall be satisfied. I confess it would have been my wish, before my notes assumed their present shape, that actual practice had confirmed or negatived my ideas; but the Shoulder-joint Operation occurs so seldom, that in the usual routine it may not be met with for years. I have therefore less hesitation in submitting my views to the consideration of others.

The extirpation of the arm bone from its connections with the scapula and clavicle, however much it may be decried, is often left as the practitioner's dernier ressort, and which, notwithstanding every objection, he must occasionally perform; it therefore becomes a truly interesting object to weigh well the various modes that have been proposed, and are now practised, especially as it not unfrequently happens that the surgeon has never witnessed any of them, until he is called upon to act. But it is not my intention to enter into the unprofitable and possibly unentertaining pursuit, of tracing this subject through the different authors who have written on it, though it would be, by no means, a tedious undertaking.

Reflecting on the excision of the Humerus, we consider an operation, which from the extent of surface exposed, the nature and value of the parts subjected to it, their proximity to the great vital organ, the danger of the patient, and the knowledge which the operator ought to possess, must assuredly be ranked as one of the first in our art. The necessity of it has been long admitted, yet it is even now gaining ground, rather by its own indispensability, than by the warmth of any advocate, if we except Bromfield. It has silently crept forward, and when we find any measure thus gradually arising into common use by its own merit, and without the preponderating authority of great names, we ought to feel more inclined to give it an approving suffrage. Of late years, most particularly, has this one been tacitly elevated.

Still, when our assistance is required, we can only consult the less scientific methods of the elder surgeons, the brief suggestions of modern authors, or depend entirely on our own judgment, and what knowledge we may have acquired by oral communications.

Practitioners in the Navy and Army, very frequently meet cases requiring the extirpation of the humerus from its socket; but the nature of their service, prevents them from communicating the issue to the public. Nevertheless, reports are rapidly handed from one to another with a freedom of remark, and a carelessness of criticism, that is to a certain degree beneficial. From this respectable source, in which we view the result of positive experience, and from the directions of surgical professors, I intend to enumerate the steps of the operation as it is now generally performed in the Camp or Naval Hospital; but from a conviction that a far superior mode was originally adopted, I shall contrast the methods, making a few farther observations, which may be judged worthy of attention.

Amputations at the smaller articulations had long been familiar, when the first description of that for the excision of the humerus appeared in the French authors: Paré took off the cubit from the elbow joint, "drying up the sanies, and delighting his "patients with the grateful titilations of "burning irons;" and Le Dran imitated him at the shoulder, " successfully too;" all he dreaded was the instant death of his patient by hæmorrhage, and this fear continued to prevail till the time of Bromfield.

Sharp, who about fifty or sixty years ago, introduced the excision of the humerus into Britain, directs our commencing with securing the artery; and proceeding to the dislocation of the bone, he advises us to be careful in beginning to divide the capsular ligament near the axilla, lest the processus acromii and coracoides " embarrass, if not baffle the operation." After stating the necessity of it in the armies, he says, he has known it done, " at least from analogy it may be effected." Still, from the very unfinished detail he gives of it, and from his asserting that the processes might " baffle," it is evident he was little acquainted with it; in fact, he only remarks that, he believes such a thing is practicable with safety. He tells us, surgeons in his day, feared the immediate death of their patients by hæmorrhage; but, his method of avoiding this issue will scarcely be attempted, even by those who prefer taking up the vessel before they proceed further. The space between the head of the humerus and the acromion, is distinctly to be felt; it is ample, and can never be mistaken with ordinary knowledge of the anatomy of the parts.

Bromfield, about fifteen years after Sharp, in a fuller detail of the operation, of which he is a fortunate supporter, states, that until a short time previous, caries in the articulation had been considered incurable, and the sufferers were permitted to sink under their misery. He also gives it as his opinion, that neither Sharp nor Heister had ever performed it, and in the hands of the army surgeons, it had universally proved unsuccessful. Though not much encouraged at the time, by these observations, he was afterwards led into an operation approximating to the excision of the humerus; this case proved eventually fatal, but the circumstances of it were such as to make him wait, confidently, for an opportunity of perfecting the extirpation.

An old woman was brought into St. George's Hospital with a fracture of the humerus near its middle, attended with a laceration of the blood vessels, which on her admission was not discovered; the ends of the bone were applied, and at the usual time, the bandages being removed, it was found that no callus had formed: a roller was put on lightly, but the swelling and tension increasing, the limb was poulticed, and a few days thereafter, Bromfield thought he distinguished fluctuation. With the consent of the "gentlemen present," he made an incision through the deltoid muscle, when a torrent of blood issued out so fast, that the nature of the tumour was instantly evident, and amputation was considered the only chance of saving the patient's life. Accordingly, having compressed the vessels in the axilla, and secured them, he divided the soft parts, and the arm came away, the extravasation of blood having prevented any osseous union. Every thing went on well, till, unfortunately, the patient, fourteen days after the operation, was seized with putrid fever, rife in the Hospital, of which she died. The head of the bone was found sound within its capsule, no fluid having penetrated that ligament: this case paved the way in Bromfield's mind, for the attempt at the complete excision of the humerus, and assured him that it was not attended by those sad consequences which had been hitherto pictured; he became readily convinced that the management of the artery was not so difficult a matter. That fear overcome, the other parts appeared comparatively light. By this circumstance, he relieved the operators from the dread of fatal bleeding; and the terror of the instant death of the patient, no longer haunted the imagination. Still, he continues, " there is not an operation " so disagreeble to the surgeon; it is tedious " and difficult to him, and more painful to " the patient than other amputations, as the "nerves are not compressed." He then enters on a prolix anatomical description of the parts, and after criticising the modus operandi of others, he proceeds to give his own.

He prefers the patient being placed on his side, and also commanding the subclavian artery, as it passes out from between the scaleni muscles; justly remarking, that this pressure is preferable to any tourniquet that can be described. He commences with a semicircular incision, dividing the integuments and muscles from above the insertion of the pectoralis major in the humerus, obliquely downwards, and backwards to the insertion of the deltoid; he then turns his knife upwards and backwards to the folding of the skin in the axilla; he next makes a perpendicular incision to the bone, through the deltoid muscle, until it meets his first; thus forming a double lambeau, he dissects off the inner flap as high as possible, and cutting through the tendon of the pectoralis close to the humerus; using his finger as a director. Should the vessels, by this means, not be sufficiently exposed, he divides the outer head of the biceps; then with an instrument, similar to a blunt needle fixed in a handle, he passes a double ligature under the artery, and ties it first about two inches below the head of the humerus, securing it with the surgeon's knot; half an inch lower, he ties it again; and beneath this last ligature, at the same interval, he divides the artery. He pursues the like steps with the vein. An assistant drawing the vessels out of the way, he cuts the nerves somewhat higher than the blood vessels, and this he does, from having witnessed great distress produced by their not being made equal with the interior of the wound.

He next directs his attention to the flap, towards the back of the shoulder, and having exposed the joint, he perforates the ligaments superiorly and laterally, thrusting the bone from the socket; he then separates the remainder of the connections, and finishes by making a second semi-circular incision, commencing where his first had ended, carried so as to meet it again on the outer part of the arm, the vessels being still carefully guarded by an assistant. He passes three flat strong ligatures through the flaps, so as to form an interrupted suture. If the acetabulum appeared sound, he pared off the cartilage, and applied dry lint to the bone, letting it remain there until it dropt off. This application, he remarks, will likewise answer to forward exfoliation, should the bones be diseased.

Bromfield appears to have been, in a great degree, casually drawn towards the operation, by the facility with which he restrained hæmorrhage in the cases cited above; and his next object was, to procure granulations to fill up the cavity from the bottom. All idea of union by the first intention, he treats as theoretical, and proceeds, so as to be able, most readily, to get at the scraped acetabulum, and the hard dossils which he crammed on it. He is fully aware of the difficulty of placing the inner surface of the deltoid muscle in contact with a "bleeding part:" he could not fail to observe how it was thrown from the interior part of the wound; and thence argues strenuously in favor of the opening which he leaves.

The perpendicular incision of this author, is improved by Mr. Charles Bell, who has rounded the two flaps, convexing them towards each other, by which means a very neat surface is left, and some degree of pain saved.

Charles Bell recommends the patient being seated on a chair, and an instrument, like a boot-hook, being used to compress the subclavian artery, on which, he says, you are not entirely to depend, a second assistant is to grasp the axillary cord, and to hold the vessel in readiness for the "needle." The convexing flaps being formed, the surgeon makes an incision through the capsule and long head of the biceps; the assistant then pushes the arm bone out of the socket; and the operator carrying the scalpel, his only instrument, close to the humerus, divides the artery, which the assistant, who held the axillary plexus, then presents, that it may be secured by means of the *needle,* having first detached it slightly from the neighbouring nerves; cutting through the remaining skin, the arm comes away.

These appear to me, the most striking of the opinions of those who have written in favor of the double-flap and perpendicular incision. Garangeot however, proposed to divide the deltoid muscle transversely, forming two flaps, one from the upper end of that muscle, about four fingers breadths lower than the acromion, and the second, from the axillary integuments. The upper flap of Garangeot, De la Faye lengthened to the full extent of the deltoid muscle; the French army surgeons, most of our own operators, and several of the popular teachers, make this deltoid flap the basis of their methods.

In opposition to these respectable modern authorities, it may appear presumptuous to assert, that any other mode will be found preferable; but as high names may occasionally give weight to procedings not altogether tolerable, the duty of investigation, assuredly becomes paramount. In attempting this, I feel confident in the candid criticism of those who are best qualified to decide, and for whose opinions I entertain the greatest deference.

With respect to the preliminary step of securing the artery, it has so long been deprecated as an act of cruel and unnecessary timidity, that it would appear at present almost superrogatory to insist on its being laid aside. From my own experience I can assert, that it may dispensed with, and the communications I have had with several others, fully confirm the opinion. I have met with those who have proceeded with this false precaution once, but never with one who did not declare he considered it useless at best.

It is a practice that savours too much of those times in surgery, when the operator was afraid to hazard the slightest incision, and of those ideas which filled the mind of all who attempted the excision of the humerus before Bromfield: I understand, however, that the common advice at several most respectable surgical classes, is to commence with this ideal measure of security; and the mere word *caution*, is so universally imposing, that in this instance, it is absolutely incumbent, not only to point out the inutility and cruelty of it, but farther to shew in how much it is to be considered detrimental to ulterior success. The artery by such a step is detached from its connections, and is more exposed to corrosive sanies, which often affects it. Incisions are made into parts which might otherwise have been untouched; channels may thus be formed which will degenerate into incurable fistulæ; and even after the operator has secured the artery, he is embarrassed in every movement, least by the negligence of the of the assistant, or error in himself, he should again wound the vessel, undoing what has already cost him so much trouble, and the patient so much distress to effect. In fact, by this we add all the difficulty, pain, and hazard of the operation for brachial aneurism, to one which is in itself sufficiently harrassing; and whilst we imagine we are defending ourselves against hæmorrhage, we are laying the foundations of a secondary bleeding, of which we can only dread the event. This mode is now, in Military Hospitals, generally disused; and that most commonly adopted by army and navy surgeons is, as I have before observed, founded on De La Faye's method with the deltoid flap, nearly as follows.

An incision is made down the arm bone, from about the heighth of the second rib, on the edge of the deltoid muscle, shaping, not the angular V of Sabatièr, but the segment of a circle, or rather an ellipse, keeping the muscle as the guiding point, down to the insertion of which into the humerus this cut is made; traversing the arm, it is thence turned upwards and backwards, over the insertion of the latissimus down towards the spine of the scapula, about two or three inches below the posterior point of the acromion. The deltoid is dissected off from the bone of the arm, and thrown back upon the shoulder; the inner surface is attached, but very slightly, to the neck of the humerus; and when the flap is raised, the head of that bone, covered by the expanded tendons of the different muscles of the joint, which appear to flatten themselves into a capsule, with a sacculus mucosus, becomes evident; and a notch-like hollow betwixt the scapula and the arm, over which this ligament floats loosely, is perceptible; into this space the instrument is thrust, and moved anteriorly, so as completely to separate the connection on that side, as well as the round head of the biceps; the knife being directed backward, an incision is perfected through another considerable portion of the capsular membrane, and the fingers of the left hand being made to pass round the condyle into the glenoid cavity, will point out those parts of the attachment which are not destroyed. The scalpel, or an amputating knife, being now past most frequently from within outwards, the arm is completely freed: the great vessels are drawn out by the tenaculum, and included in the usual manner, as also, the articular branches; the ends of the nerves being shortened occasionally, the deltoid flap is brought down, and compresses are applied to keep the belly of that muscle as closely as possible in contact with the inner surface of the wound.

In the mode adopted by the French surgeons, I have been informed, that it is usual to pass a catlin under the fleshy belly of the deltoid muscle, and drawing the instrument downward, to form thus; the lambeau of the length that is wished.

The ligation of the axillary artery has been of late years so frequently performed, and I may almost add, so uniformly successful, that the mere division of this vessel, considerable as it is, is no longer esteemed the great bar to the excision of the humerus. The practitioner looks to its general issue, and finding it more fatal, and more tedious in the cure, than common amputation, naturally seeks for some other cause, and generally perceives that the generation and confinement of matter, is the baneful source of the unhappy catastrophe. Sinuses are formed from the clavicle and sternum to the ileum, secondary hæmorrhage and hectic succeed, and our best hopes are too often thus eventually frustrated.

It is therefore a great desideratum, to be able, by avoiding these, so far to bring the shoulder-joint operation on a par with other amputations; possibly from the nature of articular surfaces, which are certainly less quietly disposed for the "uniting process" than other parts, this cannot be completely effected; but, when there is no caries, nor specific lesion of the joints, I do not see why we should entirely despair of it. Bromfield deems the idea of union by the first intention perfectly visionary; and partial success having deadened the proper feelings of occasional misfortune in many since his time, we find Alanson's admirable discovery too little applied to use, in the instance now under our consideration. In the simple operation of the phalanges of the finger, we almost universally succeed by this means; and in separating the foot from the ankle, or dislocating metatarsal joints, this fatal issue, and this liability to sinus, are seldom subsequent; although at a distance so much farther from the force of the circulating power, we might perhaps as naturally expect it.

It has, nevertheless, been this chief object of "union by inosculation," which all those have had in view, who scraped the acetabulum, and pared away the ligaments and synovial apparatus, which it was imagined prevented adhesion by peculiar natural structure.* Now although I do not deny, that I consider these parts as less apt to adhere, yet I believe the principal source of the mischief, is with greater propriety attributed to a mere mechanical cause—the non-approximation of parts.

De La Faye imagined he had done much towards the improvement of this operation, when forming his flap to the full length of the deltoid muscle, he effected a depending drain for any exudations which might follow; conceiving that Garangeot's short inferior flap would act as a receiver for them. I question much, whether he has not wandered farther from the mark than even Garangeot. For although, when De La Faye had brought down his deltoid lambeau, a very neat surface was formed externally, and a speedy union succeeded between the edges of his flap and the parts to which they were opposed; yet, he thus hermetically sealed the large cavity left beneath the acromion, whilst the deltoid was forced from the interior part of the wound.

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* Mr. Langstaff, of Fore Street, in the Medical Review for January 1811, relates the issue of six cases; four, wherein the glenoid cavity was not taken away, terminated in sinus; and two, where it was healed rapidly, without any fistulous or sinous discharge.

The glenoid cavity, surgeons have been anxious to cover with substance that might adhere to it, forgetful of the large triangular space above it, in which, lymph, synovia, and oozing of blood being retained, and the absorbents at the same time unequal to take them up, these effusions become acrimonious, and the fertile source of irremediable distress. Powerful as we may find the effects of compression in many instances, allowing too for a slight tumefaction of the inner surface of the wound, and giving every credit to the absorbing vessels: still, I cannot consider these efficient to procure adhesion, nor calculated to prevent those unfortunate terminations which too commonly occur.

It not unfrequently appears that these offending humors collect, and the practitioner is obliged to separate the recently cemented lips of the wound, and after the evacuation of the irritating matter, to replace the flap, commencing de novo; or should there be, unfortunately, any secondary hæmorrhage, he is much perplexed in fixing his finger on the aneurismal point, the seats of mischief being so various, and their range so extensive.

Farther; whoever takes the trouble of examining the cavity of the joint, after the extirpation of the humerus, will perceive, that the deltoid flap must first be doubled under the acromion, and then describe a right angle to this folding, to attach itself accurately to the parts beneath; and the compression necessary for this purpose would be such, as might produce consequences highly dangerous.[*]

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[*] I do not wish to assert, that a properly graduated bandage is not the fittest application after this operation; but to consider any compression which can safely be made use of, equal to effect an exact opposition of parts, appears to me futile.

It is to be regretted that Bromfield, who mentions the want of success amongst the military practitioners of his day, did not particularise its cause. It may however in my mind, be justly referred to the reason above mentioned, collection in the joint. For he specifies, after a lapse of three weeks, as the period when the unfortunate symptoms appeared; when probably great constitutional affection having been produced, or secondary hæmorrhage having occurred, the patient was carried off.

I have little doubt, that the observance of the impossibility of keeping the flaps, approximated to the trunk, owing to the mechanial structure of the joint, which every surgeon must have noticed in dislocation of the humerus, and of which this hollow under the acromion is a principal diagnostic, led Bromfield to treat as chimerical every idea of union by the first attention, and induced him to wait for Nature's second process, stuffing the acetabulum with hard dossils;

still his success, it might have been conceived, would have encouraged others to persist in his plan, even though they might dispense with some of his syndons. This consideration, and having frequently witnessed the detrimental consequences arising from De la Faye's method, would prove sufficient motives with me, to follow those measures which have been found so beneficial; and as this affords an easy opportunity of proceeding to a farther step, by means of which much, I think, may be done towards the cure by the first intention, I am confident that it ought on every possible occasion to be resorted to.

In submitting my present proposition, I own I feel considerable diffidence. Still I deem it highly culpable in any one not to circulate those ideas which may strike his imagination in practical points, however much he might feel inclined to remain silent on such as are merely theoretical, and not immediately tending to the great object of all our studies.

Having considered the want of proximity and contact of parts, as the great preventative of the desired result, by the opportunity thus afforded for collections to form, we naturally look for the reason of this last, and the application of a remedy. We observe the upper end of the deltoid muscle considerably detached from the inner surface, by the projection of the acromion; but if we remove it, the parts fall flat upon the sides of the ribs and interior of the joint; this then, it would be my object to effect whenever it is practicable.

Operation at the articulation of the humerus, being our "ne plus ultra," the cases where it is deemed requisite, are somewhat anomalous. Gangrene or wound, often do not leave us the choice of covering the exposed surface as we could desire, we must therefore form the flap from where we can, only talking of option, as we do in injuries of the skull, where local affection solely directs our endeavours.

When it is in our power, I conceive it would be preferable to commence the first incision about an inch above the edge of the acromion, a few lines behind its connections with the clavicle, and on coming to the edge of the scapular process, to carry it so as to describe two diverging segments down to the axilla, posteriorly and anteriorly, as represented in the sketch given by Mr. Charles Bell. In whatever method we determine upon, the first stroke ought to be only through the skin, and cellular membrane, otherwise their retraction leaves a gaping wound, with protruding muscular substance, in the ulterior part of our proceedings; on this account I should prefer (even if performing the deltoid flap) using the scalpel to the catlin. The second incision must be through the deltoid muscle down to the arm bone, following the line of, sloping under, and keeping close to the incised tegument. We then proceed to dissect off the soft parts, commencing posteriorly, inclosing every vessel as it bleeds; for in no operation is it so requisite, by every possible means, to guard against exudation. The flaps being gently drawn asunder, the scalpel is to be passed into the cavity of the joint at its superior part, and the capsule divided as fully as possible, before we attempt to displace the bone. The fingers of the operator's left hand now moving into the articulation, and any part of the ligament still untouched (as generally happens to a portion at the lower edge of the glenoid cavity) being ascertained and separated with the same instrument, the head of the bone is thus completely excised. We then raise the humerus to nearly a right angle with the trunk, and by a sweep of the amputating knife from without inwards, make an incision through the soft parts, dividing the axillary plexus, and disengaging the arm. The open mouth of the great artery is instantly evident at the lower and anterior angle of the exposed surface; it ought to be drawn out with the fingers, tenaculum, or forceps, and included in a ligature of three or four threads, tied with the common knot; the vein also occasionally may require ligation. The shining unretracting ends of the nerves are to be shortened as closely as possible to the lower extremity of the wound, and the assistant desisting from compression, every vessel is to be regularly attended to, carefully observing, that no doubling or folding of the flaps, can act as a tourniquet upon their trunks, or in any way retard the sanguinary impetus.

I should then recommend, proceeding still one step farther, to feel for the connection of the clavicle with the scapula; it is instantly distinguishable, its motion is evident in the state in which the joint now is. I then propose tracing a line with the scalpel perfectly clear of this synarthrosis, inclining from, but nearly parallel to the edge of the acromion, and with a short metacarpel saw, or such a one as mentioned by Sculletus, and re-introduced by Mr. Hey, we can remove about two inches in length, and six or eight lines in breadth, of irregularly shaped projecting bone; though the size of this will vary in different subjects. The axillary artery being now defended by the finger of the operator, the coracoid process is to be cleared, and a portion of it sawed off, which, with the ligamentum triangulare magnum, will level a space not much less than that occupied by the portion of acromion. Should the point of this process prove sharp, it can easily be rounded.

This large projection, the provision of nature against accident, now no longer requisite, being removed with any loosely attached fragments of capsule, cartilage, or tendon, a much flatter surface is presented to the flaps, and union is at least not prevented; the parts are neatly brought together, and if the adhesion does not prove complete, the cavity to be filled up by granulation, is not so great. Little space is left for the lodgment of matter, and should collections unhappily be formed, the central and deepest part of the wound is that most easily got at, and liberated from any irritating cause, at the same time that an equally depending drain is left for accumulating fluid, as in the mode with the *deltoid* incision.

The flaps being wiped and cleared from coagula, are to be closely kept together with sticking plaster and smooth compresses, and the ligatures hanging out from the orifice according to their relative situations, the patient is to be treated as is usual after operations of such magnitude.

Having witnessed the distressing and ultimately fatal effects of collections of matter in the articulation, when the excision has been performed after De la Faye's plan under favourable circumstances, my mind was naturally turned to any expedient that might be devised, to avoid a similar occurrence. Latterly I have had no opportunity of putting my project to the test on the living body, which, from a thorough conviction of the principles on which I act, I should most consciencioously do. I have not however omitted demonstrating the superiority of Bromfield's method, together with the removal of the projection, &c. on the dead subject, and the point in question being so far mechanical, I do not conceive it inadmissible to derive our practice from anatomy, for, on considering attentively the vast protrusion of the deltoid, caused by the acromion and coracoid process, with their connection, the ligamentum triangulare, I feel satisfied, that much may be done by overcoming it. My opinion I some time ago expressed to Dr. M'Gregor, who informed me that "the acromion" had been once removed "by a naval practitioner at Haslar." On farther enquiry, I was informed it had not been done with any view to a permanent chirurgical improvement, but in consequence of that process being found in a diseased state. Unfortunately, the gentleman alluded to in this case, is employed on a distant service, and I can only give an hearsay detail; of its veracity, however, there does not exist a vestige of doubt.

Moreau the elder, also, in one instance, took away a considerable portion of the upper process of the scapula and articulating surface, and both these cases terminated favourably.

I have likewise mentioned my sentiments to several highly respectable members of the profession, and I have not heard any very material objection urged against what I have just proposed. The principal argument expressed, has been the increase of torture to the patient; but if we for a moment reflect how much we save, by not, in the first place, encircling the artery, this addition will be completely shaded in the comparison; yet this is rather an unfair way of replying. I have therefore to observe, that I shall ever consider the suggestion as deserving the most serious attention. It has always been a primary object to diminish pain, for independent of the insuperable feelings of humanity, it greatly facilitates the execution of the most harassing of our duties. In this instance, however, I think it will appear that the supposed augmentation of distress has been over-rated. The patient is not detained above a minute, at the very utmost, longer on the table. The dissection of the skin from the scapulary process is perfected in a few seconds, and the bone itself is not acutely sensible; whilst this temporary increase of suffering, in the sum of so serious an operation, is amply counterbalanced by the prospect of an easier, speedier, and more certain termination: and if it could be the great object of the practitioner, in any instance, to act with haste in preference to use; he will find that the excision of the humerus, if the minute arterial branches do not occupy much time, may be finished in three or four minutes. I have known it performed in considerably less.

It has likewise been suggested to me, that the rough points of the acromion might produce inconvenience; but the scapula does not differ in structure from other bones, and we may expect its divided edge, will adhere in a similar manner with that of the femur, or any other, when properly covered.

Having stated, how anomalous the cases are, which require the excision, and how often it is difficult to preserve a flap of sufficient size. I must observe, at the same time, that when the omoplate projection is sawn off, so great an extent of covering is not required, as when the lambeau is held out by it, from the trunk.

I HAVE now to make a few cursory remarks on the Shoulder-joint Operation in general.

As far as my information and observations lead me, I find, that as usually performed, it terminates fatally in one case in six, whilst Bromfield declares he was uniformly successful.

The knowledge of the anatomy of the parts is so easily obtained, that it is by no means the difficult operation which authors represent it to be. To perform correctly the circular incision through the skin and muscles in common amputation, requires infinitely more nicety, than any part of this simple piece of dissection. It is not more painful to the patient, as the great portion of parts subjected are not more sensible than those exposed in ordinary amputations, and it is effected in as short a space of time.

With regard to the position of the patient, that must depend on circumstances; he often cannot bear the erect posture, otherwise sitting on a chair, opposite an oblique light, will be found preferable in point of convenience to the operator. The arm ought to be kept close to the trunk, until the complete division of the capsular ligament. It is almost unnecessary to observe, that absolute command of the patient must be obtained by proper assistants.

John Bell, quoting Camper, declares that entire reliance is not to be placed on pressure from above, proving an effectual preventative of axillary hæmorrhage; and recommends it from below in preference. This last method, I believe, is not generally in use, as compressing the artery with the index above the clavicle, a few folds of linen intervening, is quite enough.* Some have proposed an

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[*] Upon this principle, a tourniquet has been invented to compress the subclavian, at the point where it is occasionally the subject of ligation, viz. at the hollow betwixt the deltoid and upper edge of the pectoralis major muscles.

instrument adapted to the shape of the collar-bone and first rib, least the hand of the assistant should become cramped. The danger of unsteadiness in the patient, may be considered as one of the strongest arguments in favor of trusting solely to manual application; it is more easily made than any other, and if the tourniquet invention was to be used, and not perfectly to answer, a fatal event would most probably ensue, before recourse could be had to the finger. The assistant is fully aware of the vitality of his object, and is accordingly, on the watch for the slightest movement, to which he readily accommodates himself. A padded key ought nevertheless to be in readiness, and may be placed below the clavicle, whilst the index is kept firmly fixed above; and finally, the grasping of the axillary cord may be found useful.

To go into any enquiry as to the mode of managing the excised arteries, would be trenching on a far wider field, than I have any intention of doing. I feel I am fully borne out in asserting, that the tenaculum, with three or four threads, is the most proper for the axillary artery: the needle is here completely superseded in military practice; the mouth of the vessel is distinctly visible betwixt the silver looking nerves, somewhat more shrunk than their pendulous ends; it is large and gaping, and cannot be missed: the fingers or forceps are generally sufficient to draw it out. I cannot therefore conceive why we should be desired to use a needle, while it lies almost entirely imbedded among some of the largest nerves of the body.

THE principal anatomical points deserving observation, I shall scarcely more than nominally recapitulate, as they occur in the steps of the operation.

1. The course of the subclavian artery immediately after it emerges from between

the scaleni muscles, to its commencement as brachial artery, observing its relative situation in the axillary plexus.

2. The two points of compression are, where the artery passes from the scaleni muscles, and in the small triangular space betwixt the deltoides and pectoralis. Should the vessel not be obliterated or obstructed, the effect of the finger is evidently manifested at the wrist. The head of the patient should be inclined towards the arm subjected.
3. The deltoid muscle.
4. The sacculus mucosus over the capsular ligament.
5. The loose capsular ligament connecting the scapula with the neck of the humerus.
6. The acromion.
7. The processus coracoides.
8. The ligamentum triangulare maximum.
9. The round tendon of the biceps flexor cubiti.

10. The head of the humerus.
11. The accurate knowledge of all the internal parts of the joint, to be acquired by the sense of feeling.
12. The mouth of the axillary artery and vein.
13. The plexus of nerves.
14. The glenoid cavity.
15. The joint of clavicle with the scapular, the motion of which is sufficiently perceptible in the latter stages of the operation.
16. Any ligamentous or cartilaginous filaments which are to be taken away, together with the pendulous ends of the nerves and the synovial apparatus.
17. The number of articular arteries vary much; they are usually from three to five. Very seldom more.

The interfering with cartilaginous substances is daily found to lose much of that dread in which it was formerly enveloped. We have ankle and metatarsal joint operations frequently; and even successful hip cases are related, where a great deal of the articulating surface of course remains. Still we ought to leave as little of these as we possibly can.

I had an opportunity of viewing the cavity of the shoulder joint about three or four weeks after the excision, previous to which it had been sound. I found the muscular and cellular parts firmly coalesced; but the glenoid cavity, with a portion of ligaments, had assumed a deep cup-like appearance, and no union of these had taken place. The space between the neck of the scapula and the acromion, was filled with coagula and acrimonious discharge.

We must now briefly investigate the diagnosis of cases requiring the extirpation of the humerus; and there are few questions of greater import in surgery, either, when in common with ordinary amputations, we reflect upon the great privation to which the unfortunate sufferer is to be subjected for the rest of his existence, or when, we more particularly advert to the proportionate fatality in excision hitherto. I fear much, that from this operation having been considered as a sort of chirurgical chef d'œuvre, the young surgeon may be tempted to achieve it more frequently than he ought. I wish, for the honor of the profession, that this may prove too uncharitable a conclusion; but if the science and practice of medicine is accused of being uncertain, and vacillating between aranea and arsenic, I am apprehensive we shall also find our own lost in extremes. We may observe timorous men agitating the most trivial use of an instrument, and others unfeelingly anxious to perform the most dangerous and novel experiments.

From the comparative danger in the exposure of joints, the common amputation is never to be dispensed with, when it will answer our purpose. Large splinters of bone may be extracted from the joint, in cannon shot and musket wounds, and every thing may go on well. In caries, the head of the bone may be cut out entirely, and the arm prove highly useful: but these cases involve so many questions of constitutional affection, and of local injury, with every doctrine relative to diseased joint and compound fracture, that it appears almost impossible to lay down even general rules; so much must, in each individual case, depend on the natural discrimination of the practitioner.

I shall however enumerate a few of those occurrences, which renders it indispensable to remove the humerus from its arthrodia.

1. An ulcerated conical stump, with disease

of the vessels, extending so high as to preclude any other method of saving the life of the patient; or when such distress attends these symptoms, and is so long continued, that the patient is wasting of hectic, and soliciting this chance of relief.

2. Complicated fracture from cannon shot, or any other injury, accompanied with great destruction of the soft parts, especially of the artery. And when perhaps the arm is only attached by a small fragment of muscle, or totally carried away.
3. Extensive gangrene.
4. Caries, under particular limitations, and a full consideration of those cases in which the head of the bone only is diseased, and necessary to be extirpated.

Most of the accidental cases will be eminently influenced by the local circumstances of the patient: in a retreating army, as usual in other cases of compound fracture, it may be often imprudent to endeavour to save a limb, which, under more favourable circumstances, we should have no hesitation in attempting.

Although I am conscious of many inevitable repetitions, which the nature of the foregoing subject may possibly excuse, I shall now shortly recapitulate the points on which I have chiefly dwelt.

We find the operation usually performed with a flap, called deltoid; its fatality *one* in *six*.

We find Bromfield proceeding with a perpendicular incision, and uniformly successful; he never attempted union by the first intention, observing the distance to which the deltoid was projected by the acromion. This objection we endeavour to overcome, and procure adhesion, or lessen the receptacle for obnoxious discharge, by taking away the protruding bone.

We compress the artery with the fingers, above the clavicle.

We do not add the operation for brachial aneurism to excision of the humerus.

It proves by no means a tedious or difficult operation, and a depending drain, communicating with the whole inner surface of the joint is left, in the manner proposed.

The articular substances are to be taken as completely as possible away, together with a portion of the processus acromii and coracoides, and their connection, the ligamentum triangulare maximum, and the whole cartilaginous surface of the glenoid cavity.

THE END.

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